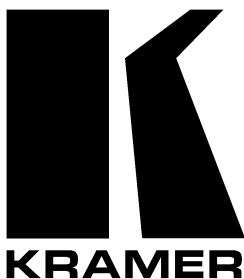


**Kramer Electronics, Ltd.**



# **USER MANUAL**

**Model:**

**VS-808DS**

*8x8 Video Audio Matrix Switcher / Scaler*

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## 1 Introduction

Welcome to Kramer Electronics (since 1981): a world of unique, creative and affordable solutions to the infinite range of problems that confront the video, audio and presentation professional on a daily basis. In recent years, we have redesigned and upgraded most of our line, making the best even better! Our 500-plus different models now appear in 8 Groups<sup>1</sup>, which are clearly defined by function.

Congratulations on purchasing your Kramer **VS-808DS** 8x8 Video Audio Matrix Switcher / Scaler! It is ideal for:

- Audio/video duplication
- Production studios
- Professional presentation systems

The package includes the following items:

- **VS-808DS** 8x8 Video Audio Matrix Switcher / Scaler
- Power cord and Null-modem adapter
- Windows®-based Kramer control software<sup>2</sup>
- Remote IR cable (optional)
- Infra-red remote control transmitter (including the required batteries and a separate user manual<sup>3</sup>) and this user manual<sup>3</sup>

## 2 Getting Started

We recommend that you:

- Unpack the equipment carefully and save the original box and packaging materials for possible future shipment
- Review the contents of this user manual
- Use Kramer high performance high resolution cables<sup>4</sup>

### 2.1 Quick Start

This quick start chart summarizes the basic setup and operation:

---

1 GROUP 1: Distribution Amplifiers; GROUP 2: Video and Audio Switchers, Matrix Switchers and Controllers; GROUP 3: Video, Audio, VGA/XGA Processors; GROUP 4: Interfaces and Sync Processors; GROUP 5: Twisted Pair Interfaces; GROUP 6: Accessories and Rack Adapters; GROUP 7: Scan Converters and Scalers; and GROUP 8: Cables and Connectors

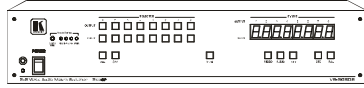
2 Downloadable from our Web site at <http://www.kramerelectronics.com>

3 Download up-to-date Kramer user manuals from our Web site at <http://www.kramerelectronics.com>

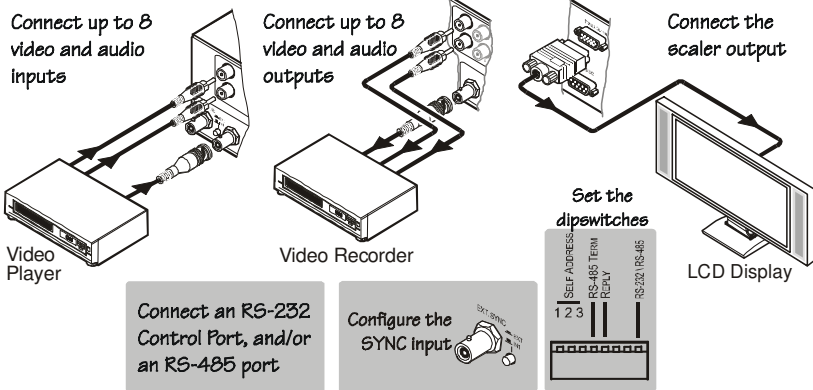
4 The complete list of Kramer cables is on our Web site at <http://www.kramerelectronics.com>

### Step 1: Mount the machine - see section 5

Mount the machine in a rack or stick the 4 rubber feet to the underside



### Step 2: Connect the inputs and outputs - see section 6



### Step 3: Turn the power ON

### Step 4: Set the machine - see section 7

**SELECTOR**

	1	2	3	4	5	6	7	8
OUTPUT	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
INPUT	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Use the SELECTOR buttons to switch the inputs to the outputs

☐ ALL  
Connect a selected input to ALL the outputs

☐ OFF  
Disconnect an output

☐ TAKE  
Press TAKE to confirm actions

**STATUS**

	1	2	3	4	5	6	7	8
OUTPUT								
INPUT								

Read the STATUS on the 7-segment display

☐ VIDEO  
VIDEO - Switching relates to the video signal

☐ AUDIO  
AUDIO - Switching relates to the audio signal

☐ AFV  
AFV - Audio follows video when switching

☐ STO  
Store (STO) and recall (RCL) actions

☐ RCL

Set the Scaler resolution via the OUTPUT RES. button. Choose one of the following:

■ VGA (640x480)	■ XGA (1024x768)
■ SVGA (800x600)	■ WXGA (1366x768)

SCALER CONTROL

OUTPUT RES. ☐ ☐ ☐ ☐ ☐

VGA SVGA XGA WXGA

### Step 5: Operate the machine

Operate via the front panel buttons, IR remote control, RS-485 and RS-232

### 3 Overview

The **VS-808DS** *8x8 Video Audio Matrix Switcher / Scaler* is a high performance matrix switcher for composite video and unbalanced stereo audio signals. It lets you simultaneously route any or all of the eight inputs to any or all of the eight outputs, plus one scaled output<sup>1</sup> (that is, output 8 also goes to the Scaler). Switching during the vertical interval ensures glitch-free switching with genlocked sources.

The **VS-808DS** features:

- A video bandwidth of 200MHz that ensures transparent performance even in the most critical applications
- Switching synchronization that lets you synchronize either to the external reference or to the incoming video
- Both audio-follow-video and breakaway options
- The storing of eight setups<sup>2</sup> (presets) to be recalled and executed when needed
- A TAKE button for executing multiple switches all at once
- The ability to control via the front panel buttons, via the infra-red remote control transmitter, via an external remote IR receiver (optional<sup>3</sup>) and remotely by RS-485 or RS-232 serial commands transmitted by a touch screen system, PC, or other serial controller
- Scaled graphics output resolutions: VGA (640x480), SVGA (800x600), XGA (1024x768), or WXGA (1366x768)
- Acceptance of PAL-B/D/G/H/I, NTSC 3.58, and NTSC 4.43 video formats

The **VS-808DS** is housed in a 19" 2U rack-mountable enclosure and is fed from a 100-240 VAC universal switching power supply.

To achieve the best performance:

- Connect only good quality connection cables, thus avoiding interference, deterioration in signal quality due to poor matching, and elevated noise levels (often associated with low quality cables)
- Avoid interference from neighboring electrical appliances and position your **VS-808DS** away from moisture, excessive sunlight and dust

### 4 Your VS-808DS 8x8 Video Audio Matrix Switcher / Scaler

This section defines the front and rear panels of the **VS-808DS** *8x8 Video Audio Matrix Switcher / Scaler*:

---

<sup>1</sup> The signal that is converted via the scaled output is the input signal that is routed to output 8

<sup>2</sup> Note, that the saved setup does not include the scaler setup

<sup>3</sup> Kramer P/N: 95-0103050)

# Your VS-808DS 8x8 Video Audio Matrix Switcher / Scaler

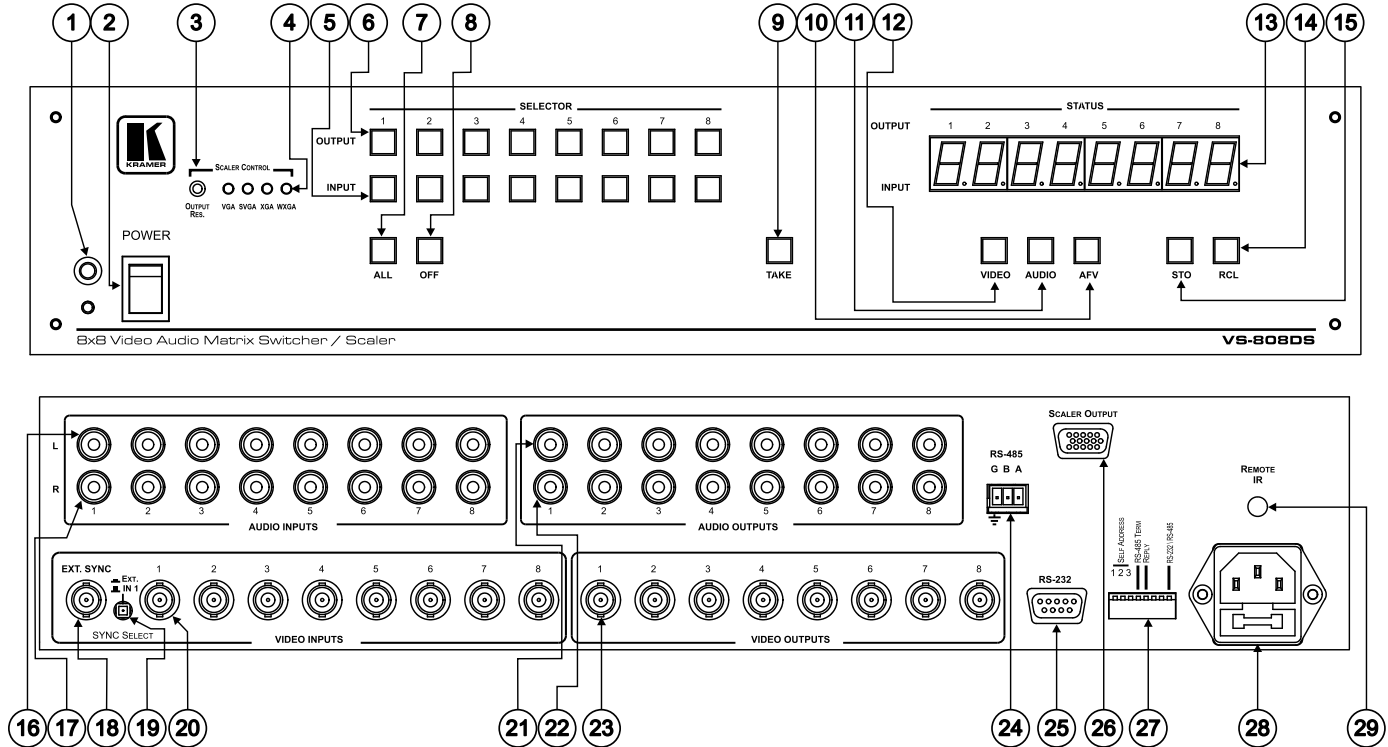


Figure 1: VS-808DS 8x8 Video Audio Matrix Switcher / Scaler Front Panel

*Table 1: VS-808DS 8x8 Video Audio Matrix Switcher / Scaler Front Panel Features*

#	Feature		Function
1	IR Receiver		The red LED is illuminated when receiving signals from the infra-red remote control transmitter
2	POWER Switch		Illuminated switch for turning the unit ON or OFF
3	SCALER CONTROL	OUTPUT RES. Button	Press to select the scaler output resolution: VGA, SVGA, XGA, or WXGA
4		LEDs	Light the specific resolution selected via the OUTPUT RES. button: VGA (640x480), SVGA (800x600), XGA (1024x768), or WXGA (1366x768)
5	INPUT SELECTOR Buttons		Select the input to switch to the output (from 1 to 8)
6	OUTPUT SELECTOR Buttons		Select the output to which the input is switched (from 1 to 8)
7	ALL Button		Pressing ALL followed by an INPUT button, connects that input to all outputs <sup>1</sup>
8	OFF Button		An OFF-OUT combination disconnects that output from the inputs; an OFF-ALL combination disconnects all the outputs
9	TAKE Button		Pressing TAKE toggles the mode between the Confirm mode <sup>2</sup> and the At Once mode (user confirmation per action is unnecessary). When in TAKE mode, pressing TAKE implements the action
10	AFV Button		When pressed (illuminates), actions relate to video and audio channels. Audio channels follow the video channels
11	AUDIO Button		When pressed (illuminates), actions relate to audio, and display shows audio status
12	VIDEO Button		When pressed (illuminates), actions relate to video, and display shows video status
13	STATUS 7-segment Display		Displays the selected input switched to the output (marked above each input). Also displays the firmware version number and the MACHINE #
14	RCL (Recall) Button		Pressing the RCL button and the corresponding OUTPUT key recalls a setup from the non-volatile memory
15	STO (Store) Button		Pressing STO followed by an output button stores the current setting

---

<sup>1</sup> For example, press ALL and then Input button # 2 to connect input # 2 to all the outputs

<sup>2</sup> When in Confirm mode, the TAKE button illuminates



*Table 2: VS-808DS 8x8 Video Audio Matrix Switcher / Scaler Rear Panel Features*

#	Feature	Function
16	<i>AUDIO INPUT L</i> RCA Connectors	Connect to the LEFT audio sources (from 1 to 8)
17	<i>AUDIO INPUT R</i> RCA Connectors	Connect to the RIGHT audio sources (from 1 to 8)
18	<i>EXT. SYNC</i> BNC Connector	Connect to an external SYNC
19	<i>SYNC SELECT EXT. / IN 1</i> Pushbutton	Press to select the external SYNC, release to select the SYNC from input 1
20	<i>VIDEO INPUT</i> BNC Connectors	Connect to the composite video sources (from 1 to 8)
21	<i>AUDIO OUTPUT L</i> RCA Connectors	Connect to the LEFT audio acceptors (from 1 to 8)
22	<i>AUDIO OUTPUT R</i> RCA Connectors	Connect to the RIGHT audio acceptors (from 1 to 8)
23	<i>VIDEO OUTPUT</i> BNC Connectors	Connect to the composite video acceptors (from 1 to 8)
24	<i>RS-485</i> Terminal Block Port	Pin G is for Ground connection <sup>1</sup> ; Pins B (-) and A (+) are for RS-485
25	<i>RS-232</i> DB 9F Port	Connects to the PC or the Remote Controller
26	<i>SCALER OUTPUT</i> HD15 Connector	Connects to the video acceptor that displays the scaled output <sup>2</sup>
27	Dipswitches	Dipswitches for setup of the unit (1, 2, and 3 are for setting the Machine # (SELF ADDRESS), 4 is for RS-485 Termination, 5 is for Reply, and 8 is for RS-232/RS-485 (see section 6.3)
28	Power Connector with Fuse	AC connector enabling power supply to the unit
29	<i>REMOTE IR</i> 3.5mm Mini Jack	Connect to an external IR receiver unit for controlling the machine via an IR remote controller (instead of using the front panel IR receiver) <sup>3</sup>

<sup>1</sup> Usually not connected. If shielded twisted pair is used for RS-485, G may be connected to the shield

<sup>2</sup> The signal that is converted via the scaled output is the input signal that is routed to output 8

<sup>3</sup> Optional. Can be used instead of the front panel (built-in) IR receiver to remotely control the VS-808DS (only if the internal IR connection cable has been installed)

## 5 Installing on a Rack

This section describes what to do before installing on a rack and how to rack mount.

### Before Installing on a Rack

Before installing on a rack, be sure that the environment is within the recommended range:	
Operating temperature range	+5 to +45 Deg. Centigrade
Operating humidity range	5 to 65% RHL, non-condensing
Storage temperature range	-20 to +70 Deg. Centigrade
Storage humidity range	5 to 95% RHL, non-condensing



### CAUTION!!

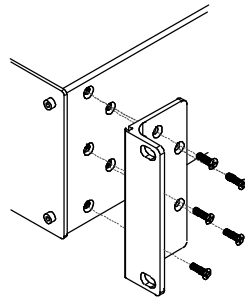
When installing on a 19" rack, avoid hazards by taking care that:

- 1 It is located within the recommended environmental conditions, as the operating ambient temperature of a closed or multi unit rack assembly may exceed the room ambient temperature.
- 2 Once rack mounted, enough air will still flow around the machine.
- 3 The machine is placed straight in the correct horizontal position.
- 4 You do not overload the circuit(s). When connecting the machine to the supply circuit, overloading the circuits might have a detrimental effect on overcurrent protection and supply wiring. Refer to the appropriate nameplate ratings for information. For example, for fuse replacement, see the value printed on the product label.
- 5 The machine is earthed (grounded) in a reliable way and is connected only to an electricity socket with grounding. Pay particular attention to situations where electricity is supplied indirectly (when the power cord is not plugged directly into the socket in the wall), for example, when using an extension cable or a power strip, and that you use only the power cord that is supplied with the machine.

### How to Rack Mount

To rack-mount a machine:

- 1 Attach both ear brackets to the machine. To do so, remove the screws from each side of the machine (5 on each side), and replace those screws through the ear brackets.



- 2 Place the ears of the machine against the rack rails, and insert the proper screws (not provided) through each of the four holes in the rack ears.

Note that:

- In some models, the front panel may feature built-in rack ears
- Detachable rack ears can be removed for desktop use
- Always mount the machine in the rack before you attach any cables or connect the machine to the power
- If you are using a Kramer rack adapter kit (for a machine that is not 19"), see the Rack Adapters user manual for installation instructions (you can download it at: <http://www.kramerelectronics.com>)

## 6 Connecting the VS-808DS

To connect<sup>1</sup> the **VS-808DS**, as the example in Figure 2 shows, do the following<sup>2</sup>:

1. Connect up to eight composite video sources (for example, input 1 connected to a camera, input 3 connected to video player and input 8 connected to a DVD player) to the VIDEO INPUT BNC connectors and the AUDIO INPUT R and L RCA connectors.
2. Connect the eight VIDEO OUTPUT BNC connectors and the AUDIO OUTPUT R and L RCA connectors to up to eight composite video acceptors (for example, composite video recorders, TV and so on).
3. Connect a PC and/or controller to the RS-232 port (see section 6.1).
4. Connect<sup>3</sup> the SCALER OUT HD15 connector to a VGA acceptor (for example, an LCD display).
5. Connect the power cord to the mains electricity (not illustrated in Figure 2).

---

1 You do not have to connect all the inputs or all the outputs

2 Switch OFF the power on each device before connecting it to your VS-808DS. After connecting your VS-808DS, switch on its power and then switch on the power on each device

3 After connecting the power, if required, press the OUTPUT RES. button to set the scaled output resolution

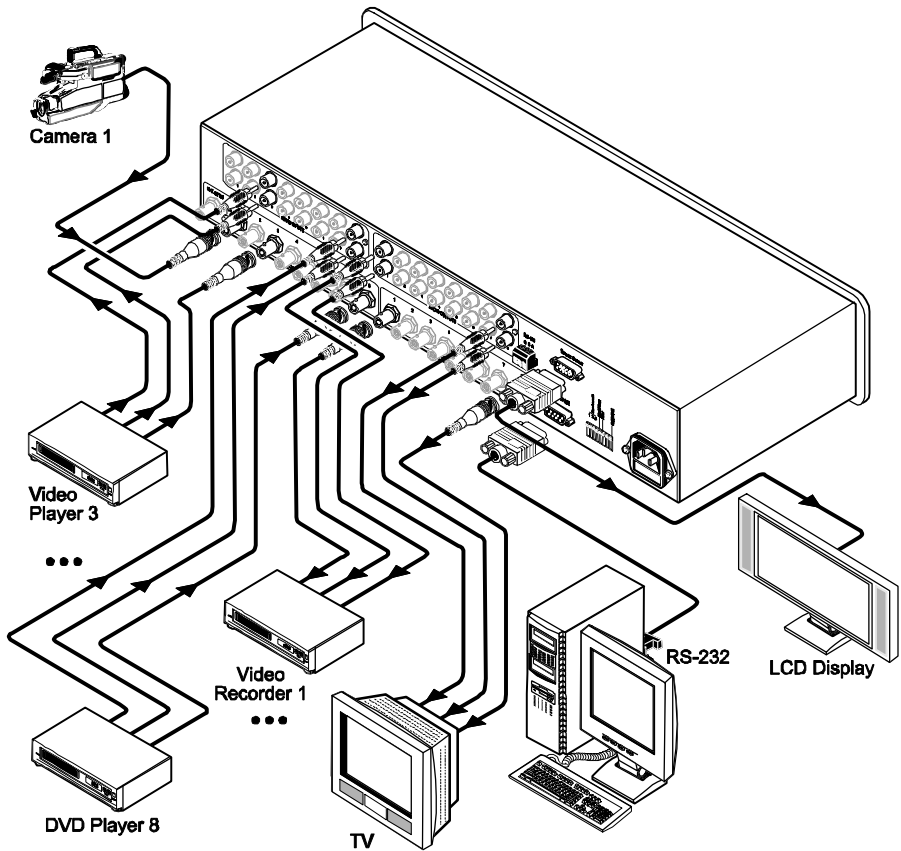


Figure 2: Connecting the VS-808DS 8x8 Video Audio Matrix Switcher / Scaler

## 6.1 Connecting a PC

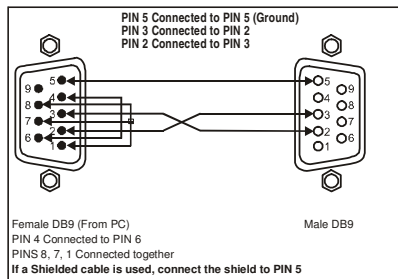
You can connect a PC (or other controller) to the **VS-808DS** via the RS-232 port.

To connect using the Null-modem adapter provided with the machine (recommended method):

- Connect the RS-232 DB9 rear panel port on the **VS-808DS** to the Null-modem adapter and connect the Null-modem adapter with a 9-wire flat cable to the RS-232 DB9 port on your PC

To connect without using a Null-modem adapter:

- Connect the RS-232 DB9 port on your PC to the RS-232 DB9 rear panel port on the **VS-808DS**, as Figure 3 illustrates



*Figure 3: Connecting a PC without using a Null-modem Adapter*

## 6.2 Connecting via RS-485

You can control a **VS-808DS** unit via an RS-485 controller, or a Master Programmable Remote Control system such as the Kramer **RC-3000**.

To connect an **RC-3000** to a **VS-808DS** unit (see Figure 4), connect the RS-485 terminal block port on the **RC-3000** to the RS-485 port on the **VS-808DS** unit, as follows:

- Connect the “A” (+) PIN on the RS-485 rear panel port of the **RC-3000** to the “A” (+) PIN on the RS-485 rear panel port of the **VS-808DS** unit
- Connect the “B” (-) PIN on the RS-485 rear panel port of the **RC-3000** to the “B” (-) PIN on the RS-485 rear panel port of the **VS-808DS** unit
- If shielded twisted pair cable is used, the shield may be connected to the “G” (Ground) PIN on one of the units (for example, on the **RC-3000**)
- Set the **VS-808DS** unit to a Machine # other than 1, according to Table 4, and set DIP 4 ON (for RS-485 Line Termination with 120Ω)

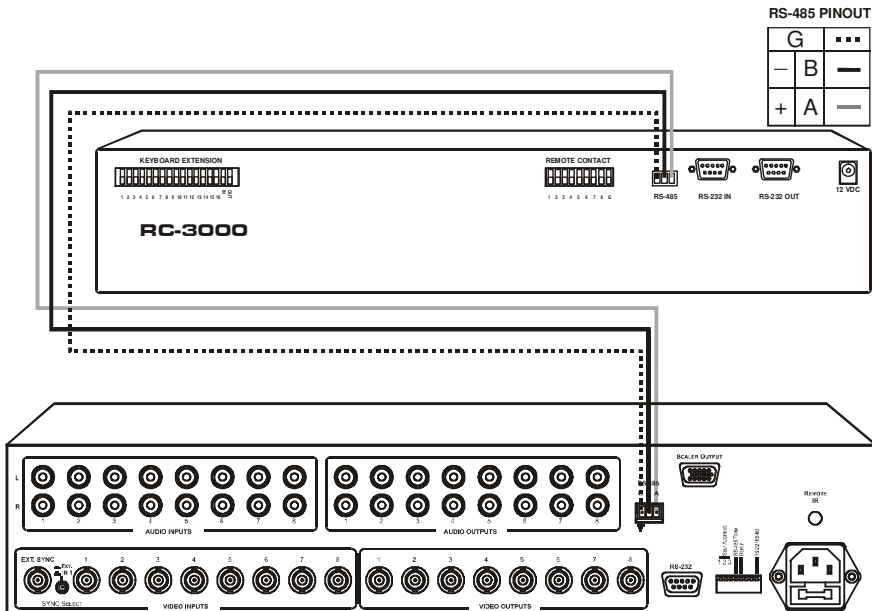


Figure 4: Controlling via RS-485 (for example, using an RC-3000)

## 6.3 Setting the VS-808DS Dipswitches

This section describes the machine set-up and dipswitch selection.

Figure 5 and Table 3 define the factory default dipswitches.

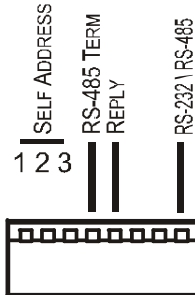


Figure 5: VS-808DS Dipswitches

Table 3: Dipswitch Settings

DIPS	Function	Description
1, 2, 3	SELF ADDRESS	Determines the position of the machine in the input expansion configuration
4	RS-485 TERM	ON for RS-485 Line Termination OFF for no RS-485 Line Termination
5	REPLY	ON enables reply from switcher to PC OFF disables reply from switcher to PC
6, 7	RESERVED	
8	RS-232 \ RS-485	ON enables RS-232 communication between switcher and PC OFF disables reply from switcher to PC

### 6.3.1 Setting the SELF ADDRESS Dipswitches

The SELF ADDRESS determines the position of a **VS-808DS** unit in the sequence, specifying which **VS-808DS** unit is being controlled when several **VS-808DS** units are controlled by a PC or serial controller. Set the SELF ADDRESS on a **VS-808DS** unit via DIPS 1, 2, and 3, according to Table 4.

- When using a stand-alone **VS-808DS** unit, set the SELF ADDRESS to 1
- When connecting more than one **VS-808DS** unit, set the first machine (the Master) connected via RS-232, as SELF ADDRESS # 1. The Master connects to the PC via the RS-232 port. The other **VS-808DS** slave units (each set<sup>1</sup> to a SELF ADDRESS # between 2 and 8) interconnect via their RS-485 ports to the RS-485 port on the Master

<sup>1</sup> You do not have to number the units in the sequence order as they connect to the PC

*Table 4: Self Address # Dipswitch Settings*

MACHINE #	DIPS		
	1	2	3
1 Master	ON	ON	ON
2	OFF	ON	ON
3	ON	OFF	ON
4	OFF	OFF	ON
5	ON	ON	OFF
6	OFF	ON	OFF
7	ON	OFF	OFF
8	OFF	OFF	OFF

### 6.3.2 Setting the REPLY Dipswitch

Dipswitch #5 (the REPLY dipswitch) enables or disables a reply from the **VS-808DS** to the PC.

Enabling the reply is usually desirable, so that the controlling device “knows” that the controlled device has carried out its instructions. When an RS-485 connection is used for communication between the Matrix Switcher and the PC, dipswitch #8 should be set to OFF. In some applications, it may be desirable for some machines not to reply to instructions received on the RS-232 and RS-485 ports. In this case, the REPLY, or acknowledgement commands should be disabled.

### 6.3.3 Setting the RS-232/RS-485 Dipswitch

The RS-232/RS-485 dipswitch allows you to enable RS-232 communication between the Matrix Switcher and the PC.



## 7 Operating Your VS-808DS

This section describes:

- The 7-segment display (see section 7.1)
- How to switch an input to an output (see section 7.2)
- The audio-follow-video and breakaway options (see section 7.3)
- How to confirm settings (see section 7.4)
- How to store and recall input/output configurations (see section 7.5)
- How to reset the machine (see section 7.6)

### 7.1 Displaying the Unit Characteristics

The **VS-808DS** 7-segment display shows the selected audio<sup>1</sup> or video<sup>2</sup> input switched to the marked output.

The unit's characteristics<sup>3</sup> are displayed in the following circumstances:

- Immediately (and automatically) after switching on the power; and
- When simultaneously pressing and holding for 3 seconds the INPUT buttons:  
1, 2 and 3 (see section 7.6)

### 7.2 Selecting and Connecting an Output and/or Input

To switch an input to an output, press the desired OUTPUT button, followed by the desired INPUT button.

In addition, to:

- disconnect a video/audio Input from a specific output, press the desired OUTPUT button followed by the OFF button. To disconnect all the outputs, press the ALL button, followed by the OFF button
- connect a video/audio input to all outputs, press the ALL button followed by the INPUT button corresponding to the input that is to be routed to all the outputs

---

<sup>1</sup> When the Audio button illuminates, that is, when the audio breakaway mode is selected

<sup>2</sup> When the Video button illuminates, that is, when the video breakaway mode is selected

<sup>3</sup> Machine model and software version

## 7.3 Choosing the Audio-Follow-Video or Breakaway Option

You can switch stereo audio signals in one of two ways, either:

- Audio-follow-video (AFV), in which all operations relate to both the video and the audio channels; or
- Breakaway, in which video and audio channels switch independently

### 7.3.1 Setting the Audio-Follow-Video Option

To set the Audio-follow-video (AFV) option press the AFV button:

- If the AUDIO and VIDEO configurations are the same, then the AFV button illuminates. The audio will follow the video
- If the AUDIO differs from the VIDEO, then the TAKE and the AUDIO buttons will flash. Also, the audio outputs in the STATUS 7-segment display, which will be changed, will flash<sup>1</sup>. Press the TAKE button to confirm the modification. The audio will follow the video

### 7.3.2 Setting the Breakaway Option

To set the Breakaway option:

Press either the AUDIO (for audio control only) or the VIDEO (for video control only) button:

- If the AUDIO button illuminates, switching operations relate to Audio
- If the VIDEO button illuminates, switching operations relate to Video

The STATUS window displays audio or video settings, according to your selection.

## 7.4 Confirming Settings

You can choose to work in the At Once or the Confirm mode. When the **VS-808DS** operates in the At Once mode, pressing an OUTPUT-INPUT combination implements the switch immediately. In the Confirm mode, the TAKE button must be pressed to authorize the switch.

### The At Once Mode

In the At Once mode, you save time as execution is immediate and actions require no user confirmation. However, no protection is offered against changing an action in error.

---

<sup>1</sup> Warning that you are about to modify the audio configuration for AFV operation

## The Confirm Mode

In the Confirm mode:

- You can key-in several actions and then confirm them by pressing the TAKE button, which simultaneously activate the multiple switches
- Every action requires user confirmation, to protect against erroneous switching
- Execution is delayed<sup>1</sup> until the user confirms the action

### 7.4.1 Toggling between the At Once and Confirm Modes

To toggle between the At Once and Confirm modes, do the following:

1. Press the TAKE button to toggle from the At Once mode<sup>2</sup> to the Confirm mode<sup>3</sup>.  
Actions now require user confirmation and the TAKE button illuminates.
2. Press the illuminated TAKE button to toggle from the Confirm mode back to the At Once mode.  
Actions no longer require user confirmation and the TAKE button no longer illuminates.

### 7.4.2 Confirming a Switching Action

To confirm a switching action (in the Confirm mode), do the following:

1. Press an OUTPUT-INPUT combination.  
The corresponding input number that is displayed in the STATUS 7-segment Display blinks. The TAKE button also blinks.
2. Press the blinking TAKE button to confirm the action.  
The corresponding input number that is displayed in the STATUS 7-segment Display no longer blinks. The TAKE button illuminates.

To confirm several actions (in the Confirm mode), do the following:

1. Press each OUTPUT-INPUT combination in sequence.  
The corresponding input numbers that are displayed in the STATUS 7-segment Display blink. The TAKE button also blinks.
2. Press the blinking TAKE button to confirm all the actions.  
The corresponding input numbers that are displayed in the STATUS 7-segment Display no longer blink. The TAKE button illuminates.

---

<sup>1</sup> Failure to press the TAKE button within one minute (the Timeout) will abort the action

<sup>2</sup> The TAKE button does not illuminate

<sup>3</sup> The TAKE button illuminates

## 7.5 Storing/Recalling Input/Output Configurations

You can store and recall up to 8 input/output configurations (or setups) in non-volatile memory, using the INPUT SELECTOR buttons 1 to 8.

### 7.5.1 Storing an Input/Output Configuration

To store the current status in memory, do the following:

1. Press the STO button.  
The STO button blinks.
2. Press one of the INPUT SELECTOR buttons from 1 to 8. This will be the setup # in which the current status is stored.  
The memory stores the data at that reference.

### 7.5.2 Recalling an Input/Output Configuration

To recall an input/output configuration, do the following:

1. Press the RCL button.  
The RCL button blinks.
2. Press the appropriate INPUT SELECTOR button (the INPUT SELECTOR button # corresponding to the setup #). The memory recalls the stored data from that reference.

### 7.5.3 Deleting an Input/Output Configuration

To delete an input/output configuration, do the following:

1. Press the STO and RCL buttons simultaneously.  
Both the STO and RCL buttons blink.
2. Press the appropriate INPUT SELECTOR button.  
This erases that specific input/output configuration from the memory, leaving it empty and available<sup>1</sup>.

## 7.6 Resetting the Machine

To reset the machine, press INPUT buttons 1, 2 and 3 simultaneously. The machine resets itself and a 7-segment self-test is automatically performed.

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<sup>1</sup> Storing a new configuration over a previous configuration (without deleting it first) replaces the previous configuration

## 8 Technical Specifications

Table 5 includes the technical specifications<sup>1</sup> of the **VS-808DS**:

*Table 5: Technical Specifications of the VS-808DS*

INPUTS:	8 composite video, 1Vpp/75Ω on BNC connectors 1 Sync/Video Genlock 1Vpp/75Ω with sync select switch 8 audio stereo on RCA connectors, 4dBm nominal	
OUTPUTS:	8 composite video, 1Vpp/75Ω on BNC connectors 8 audio stereo, on RCA connectors, 4dBm nominal 1 XGA on an HD15 connector	
SCALED OUTPUT RESOLUTIONS:	VGA (640 x 480), SVGA (800 x 600), XGA (1024 x 768), WXGA (1366 x 768)	
SCALED OUTPUT REFRESH RATE:	60Hz	
MAX. OUTPUT LEVEL:	VIDEO: 2.2Vpp (CV), 0.77Vpp (XGA)	AUDIO: 22dBm
BANDWIDTH (-3dB):	VIDEO: 200MHz	AUDIO: 100kHz
DIFF. GAIN:	0.05% (CV)	
DIFF. PHASE:	0.03 Deg. (CV)	
K-FACTOR:	<0.05% (CV)	
NONLINEARITY	0.1%	
S/N RATIO:	VIDEO: 74dB (CV)	AUDIO: 88dB unweighted
VIDEO CROSSTALK (all hostile)	-50dB @5MHz	
CONTROLS:	Manual, RS-232 or RS-485	
COUPLING:	VIDEO: DC	AUDIO: Input: AC; output: DC
AUDIO THD + NOISE:	0.16%	
AUDIO 2 <sup>nd</sup> HARMONIC:	0.004%	
POWER SOURCE:	100-240 VAC, 50/60Hz 18 VA	
DIMENSIONS:	19-inch (W), 7-inch (D) 2U (H) rack mountable	
WEIGHT:	1.94 kg (4.3 lbs.) approx.	
ACCESSORIES:	Power cord, rack ears	

<sup>1</sup> Specifications are subject to change without notice

## 9 Table of Hex Codes for the Master VS-808DS

Table 6 shows the “HEX” codes for switching the master **VS-808DS**.

*Table 6: Hex Codes for Switching the Master VS-808DS*

OUT	1	2	3	4	5	6	7	8
<b>IN 1</b>	01	01	01	01	01	01	01	01
	81	81	81	81	81	81	81	81
	81	82	83	84	85	86	87	88
	81	81	81	81	81	81	81	81
<b>IN 2</b>	01	01	01	01	01	01	01	01
	82	82	82	82	82	82	82	82
	81	82	83	84	85	86	87	88
	81	81	81	81	81	81	81	81
<b>IN 3</b>	01	01	01	01	01	01	01	01
	83	83	83	83	83	83	83	83
	81	82	83	84	85	86	87	88
	81	81	81	81	81	81	81	81
<b>IN 4</b>	01	01	01	01	01	01	01	01
	84	84	84	84	84	84	84	84
	81	82	83	84	85	86	87	88
	81	81	81	81	81	81	81	81
<b>IN 5</b>	01	01	01	01	01	01	01	01
	85	85	85	85	85	85	85	85
	81	82	83	84	85	86	87	88
	81	81	81	81	81	81	81	81
<b>IN 6</b>	01	01	01	01	01	01	01	01
	86	86	86	86	86	86	86	86
	81	82	83	84	81	82	83	84
	81	81	81	81	81	81	81	81
<b>IN 7</b>	01	01	01	01	01	01	01	01
	87	87	87	87	87	87	87	87
	81	82	83	84	85	86	87	88
	81	81	81	81	81	81	81	81
<b>IN 8</b>	01	01	01	01	01	01	01	01
	88	88	88	88	88	88	88	88
	81	82	83	84	85	86	87	88
	81	81	81	81	81	81	81	81

## 10 Communication Protocol

The **VS-808DS** is compatible with Kramer's Protocol 2000 (version 0.48) (below). This RS-232/RS-485 communication protocol uses four bytes of information as defined below. For RS-232, a null-modem connection between the machine and controller is used. The default data rate is 9600 baud, with no parity, 8 data bits and 1 stop bit.

*Table 7: Protocol Definitions*

MSB		LSB						
		DESTI- NATION	INSTRUCTION					
0	D	N5	N4	N3	N2	N1	N0	
7	6	5	4	3	2	1	0	
1st byte								
		INPUT						
1	I6	I5	I4	I3	I2	I1	I0	
7	6	5	4	3	2	1	0	
2nd byte								
		OUTPUT						
1	O6	O5	O4	O3	O2	O1	O0	
7	6	5	4	3	2	1	0	
3rd byte								
		MACHINE NUMBER						
1	OVR	X	M4	M3	M2	M1	M0	
7	6	5	4	3	2	1	0	
4th byte								

1<sup>st</sup> BYTE: Bit 7 – Defined as 0.

D – “DESTINATION”: 0 - for sending information to the switchers (from the PC);

1 - for sending to the PC (from the switcher).

N5...N0 – “INSTRUCTION”

The function that is to be performed by the switcher(s) is defined by the INSTRUCTION (6 bits). Similarly, if a function is performed via the machine's keyboard, then these bits are set with the INSTRUCTION NO., which was performed. The instruction codes are defined according to the table below (INSTRUCTION NO. is the value to be set for N5...N0).

2<sup>nd</sup> BYTE: Bit 7 – Defined as 1.  
I6...I0 – “INPUT”.

When switching (ie. instruction codes 1 and 2), the INPUT (7 bits) is set as the input number which is to be switched. Similarly, if switching is done via the machine's front-panel, then these bits are set with the INPUT NUMBER which was switched. For other operations, these bits are defined according to the table.

3<sup>rd</sup> BYTE: Bit 7 – Defined as 1.  
O6...O0 – “OUTPUT”.

When switching (ie. instruction codes 1 and 2), the OUTPUT (7 bits) is set as the output number which is to be switched. Similarly, if switching is done via the machine's front-panel, then these bits are set with the OUTPUT NUMBER which was switched. For other operations, these bits are defined according to the table.

4<sup>th</sup> BYTE: Bit 7 – Defined as 1.

Bit 5 – Don't care.

OVR – Machine number override.

M4...M0 – MACHINE NUMBER.

Used to address machines in a system via their machine numbers. When several machines are controlled from a single serial port, they are usually configured together with each machine having an individual machine number. If the OVR bit is set, then all machine numbers will accept (implement) the command, and the addressed machine will reply.

For a single machine controlled via the serial port, always set M4...M0 = 1, and make sure that the machine itself is configured as MACHINE NUMBER = 1.

Table 8: Instruction Codes

Note: All values in the table are decimal, unless otherwise stated.

INSTRUCTION		DEFINITION FOR SPECIFIC INSTRUCTION		NOTE
#	DESCRIPTION	INPUT	OUTPUT	
0	RESET VIDEO	0	0	1
1	SWITCH VIDEO	Set equal to video input which is to be switched (0 = disconnect)	Set equal to video output which is to be switched (0 = to all the outputs)	2, 15
2	SWITCH AUDIO	Set equal to audio input which is to be switched (0 = disconnect)	Set equal to audio output which is to be switched (0 = to all the outputs)	2
3	STORE VIDEO STATUS	Set as SETUP #	0 - to store 1 - to delete	2, 3, 15
4	RECALL VIDEO STATUS	Set as SETUP #	0	2, 3, 15
5	REQUEST STATUS OF A VIDEO OUTPUT	Set as SETUP #	Equal to output number whose status is reqd	4, 3
6	REQUEST STATUS OF AN AUDIO OUTPUT	Set as SETUP #	Equal to output number whose status is reqd	4, 3
7	VIS SOURCE	Set as input # when OUTPUT byte = 6; OR set as output # when OUTPUT byte = 7; OR set as blank period (in steps of 25ms) when OUTPUT byte = 32; OR set = 0. *****	0 - No VIS (immediate) 1 - Input # 1 2 - External digital sync 3 - External analog sync 4 - Dynamic sync 5 - Inter-machine sync 6 - Input # (INPUT byte) 7 - Output # (INPUT byte) 8 - User-defined sync 32 - RGBHV seamless switching 64 - Set for delayed switch 65 - Execute delayed switch 66 - Cancel delayed switch setting	2, 5, 17, 18
8	BREAKAWAY SETTING	0	0 - audio-follow-video 1 - audio breakaway	2
		1	0 - FOLLOW mode 1 - Normal mode	15
9	VIDEO / AUDIO TYPE SETTING	0 - for video	0 - CV 1 - YC 2 - YUV 3 - RGBS 4 - SDI 5 - CV+YC 6 - VGA scaler 7 - DVI	2
		1 - for audio	O0=0 – Unbalanced audio O0=1 – Balanced audio O1=0 – Digital audio O1=1 – Analog audio O4=0, O3=0, O2=0-Mono O4=0, O3=0, O2=1-Stereo	
		2 - for VGA and DVI	1 - 640X480 2 - 800X600 3 - 1024X768	
10	REQUEST VIS SETTING	Set as SETUP #, or set to 126 or 127 to request if machine has this function	0 - VIS source 1 - Input # or output # of source 2 - Vertical sync freq (Hz)	3, 4, 6, 7
11	REQUEST BREAKAWAY SETTING	Set as SETUP #, or set to 126 or 127 to request if machine has this function	0 - Request audio breakaway setting 1 - Request "FOLLOW" setting	3, 4, 6, 15
12	REQUEST VIDEO / AUDIO TYPE SETTING	Set as SETUP #, or set to 126 or 127 to request if machine has this function	0 - for video 1 - for audio 2 - for VGA	3, 4, 6
13	SET HIGHEST MACHINE ADDRESS	0 - for video 1 - for audio	Set equal to highest machine address	2
14	REQUEST HIGHEST MACHINE ADDRESS	0 - for video 1 - for audio	0	4
15	REQUEST WHETHER SETUP IS DEFINED / VALID INPUT IS DETECTED	SETUP # or Input #	0 - for checking if setup is defined 1 - for checking if input is valid	8



## Communication Protocol

INSTRUCTION		DEFINITION FOR SPECIFIC INSTRUCTION		NOTE
#	DESCRIPTION	INPUT	OUTPUT	
16	ERROR / BUSY	For invalid / valid input (i.e. OUTPUT byte = 4 or OUTPUT byte = 5), this byte is set as the input #	0 - error 1 - invalid instruction 2 - out of range 3 - machine busy 4 - invalid input 5 - valid input	9, 25
17	RESERVED	-	-	10
18	RESET AUDIO	0	0	1
19	STORE AUDIO STATUS	Set as SETUP #	0 - to store 1 - to delete	2, 3
20	RECALL AUDIO STATUS	Set as SETUP #	0	2, 3
21	SET VIDEO PARAMETER	Equal to input / output number whose video parameter is to be set (0 = all)	Set as parameter value	2, 11, 24
22	SET AUDIO PARAMETER	Equal to input / output number whose parameter is to be set (0 = all)	Set as parameter value	2, 11, 24
23	INCREASE / DECREASE VIDEO PARAMETER	Equal to input / output number whose video parameter is to be increased / decreased (0 = all)	0 - increase video gain 1 - decrease video gain 2 - increase contrast 3 - decrease contrast 4 - increase brightness 5 - decrease brightness 6 - increase colour 7 - decrease colour 8 - increase hue 9 - decrease hue 16 - increase H-phase 17 - decrease H-phase 18 - increase V-position 19 - decrease V-position	24
24	INCREASE / DECREASE AUDIO PARAMETER	Equal to input / output number whose parameter is to be increased / decreased (0 = all)	0 - increase output 1 - decrease output 2 - increase left output 3 - decrease left output 4 - increase right output 5 - decrease right output 6 - increase input 7 - decrease input 8 - increase left input 9 - decrease left input 10 - increase right input 11 - decrease right input	24
25	REQUEST AUDIO PARAMETER	Equal to input / output number whose parameter is requested	0	6, 24
26	REQUEST VIDEO PARAMETER	Equal to input / output number whose video parameter is requested	0	6, 24
30	LOCK FRONT PANEL	0 - Panel unlocked 1 - Panel locked	0	2
31	REQUEST WHETHER PANEL IS LOCKED	0	0	16
32 to 35	RESERVED	-	-	10
40	DIRECT MEMORY SAVE	Memory address	Data	20
42	AUDIO PARAMETER SETTINGS FOR INSTRUCTIONS 22, 24, 25	INPUT Bit: I0=input; 1=output I1 - Left I2 - Right	0 - Gain 1 - Bass 2 - Treble 3 - Midrange 4 - Mix On	24

## Communication Protocol

INSTRUCTION		DEFINITION FOR SPECIFIC INSTRUCTION		NOTE
#	DESCRIPTION	INPUT	OUTPUT	
43	VIDEO PARAMETER SETTINGS FOR INSTRUCTIONS 21, 23, 26	1 – Input 2 – Output	0 - video gain 1 - contrast 2 - brightness 3 - colour 4 - hue 5 - H-phase 6 - V-position	24
44	MEDIA CONTROL	Set equal to switch number	Switch data	
45	REQUEST MEDIA CONTROL SETTINGS	Set equal to switch number	0	
56	CHANGE TO ASCII	0	1 - SVS protocol 2 - Generic protocol	19
57	SET AUTO-SAVE	I3 - no save I4 - auto-save	0	12, 2
58	EXECUTE LOADED DATA	Set as 0, or as SETUP #.	1-Take 2-Cancel	22, 3
59	LOAD VIDEO DATA	Set equal to video input (0 = disconnect) (127 = load SETUP #)	Set equal to video output (0 = to all the outputs) or SETUP #	22, 23
60	LOAD AUDIO DATA	Set equal to audio input (0 = disconnect) (127 = load SETUP #)	Set equal to audio output (0 = to all the outputs) or SETUP #	22, 23
61	IDENTIFY MACHINE	1 - video machine name 2 - audio machine name 3 - video software version 4 - audio software version 5 - RS422 controller name 6 - RS422 controller version 7 - remote control name 8 - remote software version 9 - Protocol 2000 revision	0 - Request first 4 digits 1 - Request first suffix 2 - Request second suffix 3 - Request third suffix 10 - Request first prefix 11 - Request second prefix 12 - Request third prefix	13
62	DEFINE MACHINE	1 - number of inputs 2 - number of outputs 3 - number of setups	1 - for video 2 - for audio 3 - for SDI 4 - for remote panel 5 - for RS-422 controller	14
63	EXTENDED DATA	7 MSBs for INPUT data	7 MSBs for OUTPUT data	20

NOTES on the above table:

NOTE 1 - When the master switcher is reset, (e.g. when it is turned on), the reset code is sent to the PC. If this code is sent to the switchers, it will reset according to the present power-down settings.

NOTE 2 - These are bi-directional definitions. That is, if the switcher receives the code, it will perform the instruction; and if the instruction is performed (due to a keystroke operation on the front panel), then these codes are sent. For example, if the HEX code

01            85            88            83  
was sent from the PC, then the switcher (machine 3) will switch input 5 to output 8. If the user switched input 1 to output 7 via the front panel keypad, then the switcher will send HEX codes:

41            81            87            83

to the PC.

When the PC sends one of the commands in this group to the switcher, then, if the instruction is valid, the switcher replies by sending to the PC the same four bytes that it was sent (except for the first byte, where the DESTINATION bit is set high).

NOTE 3 - SETUP # 0 is the present setting. SETUP # 1 and higher are the settings saved in the switcher's memory, (i.e. those used for Store and Recall).

NOTE 4 - The reply to a "REQUEST" instruction is as follows: the same instruction and INPUT codes as were sent are returned, and the OUTPUT is assigned the value of the requested parameter. The replies to instructions 10 and 11 are as per the definitions in instructions 7 and 8 respectively. For example, if the present status of machine number 5 is breakaway setting, then the reply to the HEX code

0B            80            80            85

would be HEX codes

4B            80            81            85

NOTE 5 – For the OUTPUT byte set as 6, the VIS source is the input selected using the OUTPUT byte. Similarly, for the OUTPUT byte set as 7, the VIS source is the output selected using the OUTPUT byte. Note also, that on some machines the sync source is not software selectable, but is selected using switches, jumpers, etc!

NOTE 6 – If INPUT is set to 127 for these instructions, then, if the function is defined on this machine, it replies with OUTPUT=1. If the function is not defined, then the machine replies with OUTPUT=0, or with an error (invalid instruction code).

If the INPUT is set to 126 for these instructions, then, if possible, the machine will return the current setting of this function, even for the case that the function is not defined. For example, for a video switcher which always switches during the VIS of input #1, (and its VIS setting cannot be programmed otherwise), the reply to the HEX code

0A FE 80 81 (ie. request VIS setting, with INPUT set as 126dec)

would be HEX codes

4A FE 81 81 (ie. VIS setting = 1, which is defined as VIS from input #1).

NOTE 7 – Setting OUTPUT to 0 will return the VIS source setting as defined in instruction #7. Setting to 1 will return the input # or output # of the sync source (for the case where the VIS source is set as 6 or as 7 in instruction #7). Setting to 2 returns the vertical sync frequency (0 for no input sync, 50 for PAL, 60 for NTSC, 127 for error).

NOTE 8 - The reply is as in TYPE 3 above, except that here the OUTPUT is assigned with the value 0 if the setup is not defined / no valid input is detected; or 1 if it is defined / valid input is detected.

NOTE 9 - An error code is returned to the PC if an invalid instruction code was sent to the switcher, or if a parameter associated with the instruction is out of range (e.g. trying to save to a setup greater than the highest one, or trying to switch an input or output greater than the highest one defined). This code is also returned to the PC if an RS-232 instruction is sent while the machine is being programmed via the front panel. Reception of this code by the switcher is not valid.

NOTE 10 – This code is reserved for internal use.

NOTE 11 – For machines where the video and / or audio parameter is programmable.

NOTE 12 - Under normal conditions, the machine's present status is saved each time a change is made. The "power-down" save (auto-save) may be disabled using this code. Note that whenever the machine is turned on, the auto-save function is set.

NOTE 13 - This is a request to identify the switcher/s in the system. If the OUTPUT is set as 0, and the INPUT is set as 1, 2, 5 or 7, the machine will send its name. The reply is the decimal value of the INPUT and OUTPUT. For example, for a 2216, the reply to the request to send the audio machine name would be (HEX codes):

7D 96 90 81 (i.e. 128dec+ 22dec for 2nd byte, and 128dec+ 16dec for 3rd byte).

If the request for identification is sent with the INPUT set as 3 or 4, the appropriate machine will send its software version number. Again, the reply would be the decimal value of the INPUT and OUTPUT - the INPUT representing the number in front of the decimal point, and the OUTPUT representing the number after it. For example, for version 3.5, the reply to the request to send the version number would be (HEX codes):

7D 83 85 81 (i.e. 128dec+ 3dec for 2nd byte, 128dec+ 5dec for 3rd byte).

If the OUTPUT is set as 1, then the ASCII coding of the lettering following the machine's name is sent. For example, for the VS-7588YC, the reply to the request to send the first suffix would be (HEX codes):

7D D9 C3 81 (i.e. 128dec+ ASCII for "Y"; 128dec+ ASCII for "C").

NOTE 14 - The number of inputs and outputs refers to the specific machine which is being addressed, not to the system. For example, if six 16X16 matrices are configured to make a 48X32 system (48 inputs, 32 outputs), the reply to the HEX code

3E 82 81 82 (ie. request the number of outputs)

would be HEX codes

7E 82 90 82

ie. 16 outputs

NOTE 15 – When the OVR bit (4th byte) is set, then the "video" commands have universal meaning. For example, instruction 1 (SWITCH VIDEO) will cause all units (including audio, data, etc.) to switch. Similarly, if a machine is in "FOLLOW" mode, it will perform any "video" instruction.

NOTE 16 - The reply to the "REQUEST WHETHER PANEL IS LOCKED" is as in NOTE 4 above, except that here the OUTPUT is assigned with the value 0 if the panel is unlocked, or 1 if it is locked.

NOTE 17 – For clean switching of RGBHV video, the "seamless switching" option may be used. The blanking period for the transition of the RGB sources may be set in this case, in steps of 25 milliseconds.

For example, to set for 350ms blanking time (14 steps), send HEX codes

07 8E A0 81

NOTE 18 – Delayed execution allows switching after a delay dictated by RS-232. To do this, the user sends instruction 7 with the “Set for delayed switch” option (64dec) before sending the switch command (instruction 1) or pressing via front panel. The switch is not executed (unless timed-out) until the “Execute delayed switch” code is sent, or the “Set for delayed switch” code is sent again. (The mode is automatically cancelled after implementation of the switch if the “execute” command is used).

For example, to connect input 4 to output 3 after a delay, send HEX codes

07	80	C0	81	(set for delayed switch)
01	84	83	81	(switch code)

then, after the required delay, send HEX codes

07	80	C1	81	(execute delayed switch)
----	----	----	----	--------------------------

to implement the switch.

NOTE 19 – After this instruction is sent, the unit will respond to the ASCII command set defined by the OUTPUT byte. The ASCII command to operate with the HEX command set must be sent in order to return to working with HEX codes.

NOTE 20 – When data (ie. the INPUT and/or OUTPUT bytes) of more than 7 bits is required, this instruction is sent before sending the instruction needing the additional bits. The data in this instruction then becomes the Most Significant Bits of that next instruction. For example, to set the audio gain (instruction 22) of output 3 to 6813dec (2A9hex), you would first send HEX codes

3F	80	85	81
----	----	----	----

and then send HEX codes

16	83	A9	81.
----	----	----	-----

To set the audio gain of output 6 to 10013dec (271Dhex), first send HEX codes

3F	80	CE	81
----	----	----	----

followed by HEX codes

16	86	9D	81.
----	----	----	-----

NOTE 21 – To store data in the non-volatile memory of the unit, eg. the EEPROM for saving SETUPS. The EEPROM address is sent using the INPUT byte, and the data to be stored is sent using the OUTPUT byte. To use this instruction, it is necessary to understand the memory map, and memory structure of the particular machine.

NOTE 22 – Instruction 59 and instruction 60 load data for sending to the crosspoint switcher (or for storing in a SETUP), ie. the data is “lined-up” to be executed later. Instruction 58 executes the loaded data.

NOTE 23 – If the INPUT byte is set as 127dec, then the data stored in a SETUP is loaded. The SETUP # is in the OUTPUT byte.

NOTE 24 – Further information needed in instructions 21, 22, 25 and 26, is sent using instruction 42 – which is sent prior to the instruction. For example, to request the audio gain value of right input # 9, send hex codes

2A	84	80	81
----	----	----	----

and then send HEX codes

19	89	81	81.
----	----	----	-----

To set MIX mode, send hex codes

2A	81	84	81
----	----	----	----

and then send HEX codes

16
----

NOTE 25 – For units which detect the validity of the video inputs, Instruction 16 will be sent whenever the unit detects a change in the state of an input (in real-time).

For example, if input 3 is detected as invalid, the unit will send the HEX codes

10	83	84	81
----	----	----	----

If input 7 is detected as valid, then the unit will send HEX codes

10	87	85	81.
----	----	----	-----

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## LIMITED WARRANTY

Kramer Electronics (hereafter *Kramer*) warrants this product free from defects in material and workmanship under the following terms.

### HOW LONG IS THE WARRANTY

Labor and parts are warranted for seven years from the date of the first customer purchase.

### WHO IS PROTECTED?

Only the first purchase customer may enforce this warranty.

### WHAT IS COVERED AND WHAT IS NOT COVERED

Except as below, this warranty covers all defects in material or workmanship in this product. The following are not covered by the warranty:

1. Any product which is not distributed by Kramer, or which is not purchased from an authorized Kramer dealer. If you are uncertain as to whether a dealer is authorized, please contact Kramer at one of the agents listed in the Web site [www.kramerelectronics.com](http://www.kramerelectronics.com).
2. Any product, on which the serial number has been defaced, modified or removed.
3. Damage, deterioration or malfunction resulting from:
  - i) Accident, misuse, abuse, neglect, fire, water, lightning or other acts of nature
  - ii) Product modification, or failure to follow instructions supplied with the product
  - iii) Repair or attempted repair by anyone not authorized by Kramer
  - iv) Any shipment of the product (claims must be presented to the carrier)
  - v) Removal or installation of the product
  - vi) Any other cause, which does not relate to a product defect
  - vii) Cartons, equipment enclosures, cables or accessories used in conjunction with the product

### WHAT WE WILL PAY FOR AND WHAT WE WILL NOT PAY FOR

We will pay labor and material expenses for covered items. We will not pay for the following:

1. Removal or installations charges.
2. Costs of initial technical adjustments (set-up), including adjustment of user controls or programming. These costs are the responsibility of the Kramer dealer from whom the product was purchased.
3. Shipping charges.

### HOW YOU CAN GET WARRANTY SERVICE

1. To obtain service on you product, you must take or ship it prepaid to any authorized Kramer service center.
2. Whenever warranty service is required, the original dated invoice (or a copy) must be presented as proof of warranty coverage, and should be included in any shipment of the product. Please also include in any mailing a contact name, company, address, and a description of the problem(s).
3. For the name of the nearest Kramer authorized service center, consult your authorized dealer.

### LIMITATION OF IMPLIED WARRANTIES

All implied warranties, including warranties of merchantability and fitness for a particular purpose, are limited in duration to the length of this warranty.

### EXCLUSION OF DAMAGES

The liability of Kramer for any effective products is limited to the repair or replacement of the product at our option. Kramer shall not be liable for:

1. Damage to other property caused by defects in this product, damages based upon inconvenience, loss of use of the product, loss of time, commercial loss; or:
2. Any other damages, whether incidental, consequential or otherwise. Some countries may not allow limitations on how long an implied warranty lasts and/or do not allow the exclusion or limitation of incidental or consequential damages, so the above limitations and exclusions may not apply to you.

This warranty gives you specific legal rights, and you may also have other rights, which vary from place to place.

**NOTE:** All products returned to Kramer for service must have prior approval. This may be obtained from your dealer.

This equipment has been tested to determine compliance with the requirements of:

- EN-50081: "Electromagnetic compatibility (EMC);  
generic emission standard.  
Part 1: Residential, commercial and light industry"
- EN-50082: "Electromagnetic compatibility (EMC) generic immunity standard.  
Part 1: Residential, commercial and light industry environment".
- CFR-47: FCC Rules and Regulations:  
Part 15: "Radio frequency devices  
Subpart B Unintentional radiators"

### CAUTION!

- ⊗ Servicing the machines can only be done by an authorized Kramer technician. Any user who makes changes or modifications to the unit without the expressed approval of the manufacturer will void user authority to operate the equipment.
- ⊗ Use the supplied DC power supply to feed power to the machine.
- ⊗ Please use recommended interconnection cables to connect the machine to other components.



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**For the latest information on our products and a list of Kramer distributors, visit our Web site: [www.kramerelectronics.com](http://www.kramerelectronics.com), where updates to this user manual may be found. We welcome your questions, comments and feedback.**



**Caution**

**Safety Warning:**

Disconnect the unit from the power supply before opening/servicing.



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